

REMARKS

This Amendment is responsive to the Office Action dated February 19, 2010. Applicant has amended claims 1, 4, 5, 10, 14, 18, 20, 21, 28–33, 37, 39, 44, 49, 64, 75–79, and 82–83. Claims 1–86 remain pending.

Claim Rejection Under 35 U.S.C. § 101

In the Office Action, claims 1–38, 75–80, and 82–86 were rejected under 35 U.S.C. § 101 based on an assertion that the claimed invention is directed to non-statutory subject matter. Applicant has amended the claims to address the rejection under 35 U.S.C. § 101. For example, independent claim 1 has been amended to specify that the method comprises displaying, via a user interface of a computing device, a three-dimensional (3D) digital representation of a dental arch within a 3D environment, and, while displaying the digital representation of the tooth of the dental arch, displaying, via the user interface of a computing device, a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in a placement of an orthodontic appliance relative to the tooth of the dental arch. Independent claim 4 has also been amended to specify that the method comprises displaying, via a user interface of a computing device, a 3D digital representation of a tooth of a dental arch within a 3D environment and, while displaying the digital representation of the tooth of the dental arch, displaying, via the user interface of a computing device, a two-dimensional planar guide within the 3D environment as a visual aid to the practitioner in adjusting a placement of the orthodontic appliance relative to the tooth of the dental arch within the 3D environment.

Claims 75–79 and 82 have been amended to specify that the computer-readable medium includes a non-transitory computer-readable medium, as suggested by the Office Action.

In view of the amendments to the claims, Applicant respectfully requests reconsideration and withdrawal of the rejection to claims 1–38, 75–80, and 82–86 under 35 U.S.C. § 101.

Claim Rejection Under 35 U.S.C. § 112

In the Office Action, claims 5–11, 28, 30, 44–50, 64, and 78 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action asserted that it is unclear “what if any relationship exists between the orientation of the planes of

the appliance relative to the planes and orientation of the dental arch.”¹ Applicant respectfully disagrees that such a relationship is unclear. Moreover, the Office Action failed to establish why such a relationship is necessary to the definiteness of Applicant’s claims 5–11, 28, 30, 44–50, 64, and 78.

Claims 5–11, 28, 30, 44–50, 64, and 78 meet the requirements of 35 U.S.C. § 112, second paragraph. Definiteness of a claim must be analyzed, not in a vacuum, but in light of the content of, among other things, Applicant’s disclosure as well as the claim interpretation that would be given by one having ordinary skill in the art at the time the invention was made.² Applicant’s claims 5–11, 28, 30, 44–50, 64, 66, and 78 apprise one having ordinary skill in the art of their respective scopes, and, therefore serves the notice function required by 35 U.S.C. § 112, second paragraph.

Claims 5, 10, 30, 44, 49, and 78 each recite a midsagittal plane, which is a plane of the orthodontic appliance. With respect to the rejection of claims 5, 10, 30, 44, 49, 66, and 78 under 35 U.S.C. § 112, second paragraph, the Office Action stated:

[W]hile the language of the claims is consistent with the language of the specification, the claims themselves do not clearly define the term “midsagittal plane” . . . While, the Examiner recognizes the midsagittal plane as claimed is “a plane of the orthodontic appliance” it is unclear what or how this plane is defined, as the term “sagittal” given its ordinary meaning is of, relating to, situated in, or being the median plane of the body or any parallel plane to it. Additionally, Applicant states, “that a midsagittal plane of a bracket is parallel to the longitudinal axis of the bracket” (see the instant specification paragraph 0045); however, the midsagittal plane 98 of figure 10 is seemingly orthogonal to the longitudinal axis of the bracket.³

Applicant’s disclosure states that a midsagittal plane of an orthodontic appliance is parallel to the longitudinal axis of the bracket.⁴ Applicant maintains that FIG. 10 of the application illustrates a midsagittal plane 98 that is parallel to the longitudinal axis of the bracket, rather than orthogonal to the longitudinal axis of the bracket, as asserted by the Office Action. The Office Action appears to be interpreting a longitudinal axis of the bracket as running in the mesio-distal direction in the example shown in FIG. 10. However, as Applicant’s disclosure indicates,⁵ a longitudinal axis of the bracket, as the term is used by Applicant in the present disclosure,

¹ Office Action dated February 19, 2010, page 3, item 7.

² See MPEP 2173.02.

³ Office Action dated February 19, 2010, page 3, item 7.

⁴ Applicant’s disclosure, paragraph [0045].

⁵ See Applicant’s disclosure, paragraph [0043] and FIG. 10.

generally extends from a top of the appliance to a bottom of the appliance, e.g., in the occlusal-lingival direction when the bracket is positioned on the tooth with the archwire slot properly oriented. This is clearly illustrated in FIG. 10 with respect to midsagittal plane 98, which Applicant's disclosure states is parallel to the longitudinal axis of the bracket.

The Office Action asserted that the "midsagittal plane of an archwire would certainly not be 'parallel to the longitudinal axis' (where longitudinal means -running lengthwise)." ⁶ As discussed above, the longitudinal axis of an orthodontic appliance, such as an archwire, extends from a top of the appliance to a bottom of the appliance. Accordingly, a midsagittal plane of an archwire may extend parallel to the longitudinal axis of the archwire.

Applicant respectfully disagrees that the recitation of a "midsagittal plane" in claims 5, 10, 30, 44, 49, and 78 renders the claims unclear. Even if the term "midsagittal" is ordinarily defined as "relating to, situated in, or being the median plane of the body or any parallel plane to it," as asserted by the Office Action, ⁷ it is unclear how this definition renders Applicant's claims unclear. Applicant's claims still recite the claimed inventions with a reasonable degree of particularity for at least the reasons discussed in the Amendment filed on April 10, 2008, and, therefore, meet the limitations of 35 U.S.C. § 112, second paragraph. ⁸ In order to advance allowance, Applicant has amended claims 5, 10, 30, 44, 49, and 78 to specify that the orthodontic appliance defines a longitudinal axis and the midsagittal plane is substantially parallel to the longitudinal axis. These amendments are consistent with the Examiner's suggestion to amend the claims to more clearly define the midsagittal plane of an orthodontic appliance in terms of the inherent structure of the appliance.

Claims 5, 6, 44, 45, and 78 recite a mesial planar guide and a distal planar guide. The Office Action asserted that:

The claims also recite "mesial planar guide" and "distal planar guide" which in the realm of archwire raise additional issues with regard to clarity. The remarks and specification state "the mesial and distal planar guides visibly align with the mesial and distal edges of the bracket"; however, on an archwire two distal edges and no mesial edge would be present."

While Applicant does not agree with the assertions of lack of clarity, Applicant has amended claims 5, 44, and 78 to clarify that the orthodontic appliance defines a mesial edge and

⁶ Office Action dated February 19, 2010, page 4, item 7.

⁷ Applicant does not acquiesce to this definition.

⁸ See MPEP 2173.02.

a distal edge, and the mesial planar guide aligns with the mesial edge of the appliance and the distal planar guide aligns with the distal edge. Support for the amendments to claims 5, 44, and 78 can be found throughout Applicant's disclosure, such as at paragraph [0041]. Claim 6 depends from claim 5 and claim 45 depends from claim 44.

Claims 7, 8, 11, 46, 47, 50, and 78 each recite a midlateral plane of an orthodontic appliance. Applicant respectfully disagrees that claims 7, 8, 11, 46, 47, 50, and 78 are indefinite. The Office Action failed to meet the burden of demonstrating that claims 7, 8, 11, 46, 47, 50, and 78 are indefinite. For example, the Office Action failed to establish why the use of "midlateral plane" in claims 7, 8, 11, 46, 47, 50, and 78 is allegedly vague and indefinite. The recitation of "midlateral plane" in claims 7, 8, 11, 46, 47, 50, and 78 satisfies the statutory requirements of 35 U.S.C. § 112, second paragraph because, for example, one having ordinary skill in the art could interpret the metes and bounds of the claims based at least on the well-known meaning of "lateral" and "midlateral" in view of Applicant's specification.

The ordinary and well-known meaning of "lateral" is being situated at, proceeding from, or directed to a side.⁹ Thus, a "midlateral plane" is frequently used to describe a plane that bisects the middle of an object in a sideways direction. Furthermore, the term "midlateral plane" is used in a consistent manner with the well-known definition throughout Applicant's originally-filed disclosure. For example, the disclosure states that, "a midlateral planar guide . . . is rendered parallel to the midlateral plane of the bracket being placed."¹⁰ FIG. 10 illustrates a midlateral planar guide 92 that is "rendered within the midlateral plane of tooth 94." The midlateral planar guide 92 is shown as extending from one side of the tooth 94 to the other. Accordingly, the midlateral plane of the bracket, which is parallel to the midlateral planar guide 92¹¹, also extends in the same direction as the midlateral planar guide 92.

Applicant's disclosure also states that "an occlusal planar guide . . . is rendered parallel to the midlateral plane . . . of the bracket."¹² FIG. 5 illustrates an occlusal planar guide 88, which also extends from one side of a tooth to another. Thus, the midlateral plane of the bracket must also extend from one side of a tooth to another. For at least these reasons, the claim term, "midlateral" is clear to one of ordinary skill.

⁹ See, e.g., <http://dictionary.reference.com/browse/lateral>.

¹⁰ Applicant's originally-filed disclosure, paragraph [0033].

¹¹ Applicant's originally-filed disclosure, paragraph [0033].

¹² Applicant's originally-filed disclosure, paragraph [0033].

Claims 9, 48, and 78 each refer to a midfrontal plane of the orthodontic appliance. Claims 9, 48, and 78 each particularly point out and distinctly claim the subject matter that Applicant regards as the invention. The ordinary and well-known meaning of "frontal" is at the front, in the front or front of an object.¹³ Thus, a "midfrontal plane" is a plane that extends midway between the front and back of an object. "Midfrontal plane" is used in a consistent manner with the well-known definition throughout Applicant's originally-filed disclosure. For example, the disclosure states that, "a midfrontal planar guide may be rendered parallel to the midfrontal plane of the bracket."¹⁴ In addition, FIG. 10 illustrates a "midfrontal planar guide 96 rendered substantially parallel to a midfrontal plane of tooth 94."¹⁵ As FIG. 10 illustrates, the midfrontal planar guide 96 extends parallel to a front of the bracket, which is also parallel to the midfrontal plane of the tooth 94. For at least these reasons, the claim term, "midfrontal plane" is clear, even if the structure of the orthodontic appliance is not explicitly recited in claims 9, 48, and 78. As with claims 7, 8, 11, 46, 47, 50, and 78, the Office Action failed to meet the burden of demonstrating that claims 9, 48, and 78 are indefinite.

Claims 28 and 64 as previously presented each referred to an occlusal-lingival axis of the orthodontic appliance. With respect to claims 28 and 64, the Office Action stated that:

[I]t is unclear what kind of relationship, if any, exists between the orientation of the dental arch and the orientation of the occlusal-lingival axis. For example, is the occlusal-lingival axis of a lingual bracket the same as a labial bracket? While Applicant is entitled to be his or her own lexicographer, "In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by those of ordinary skill in the art." *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298 67 USPQ2d 1132, 1136 (Fed. Cir. 2003). Thus, the Examiner maintains the use of the terms "midsagittal", "mesial", "distal", and "occlusal-lingival" are unclear and indefinite.¹⁶

Applicant respectfully disagrees that claims 28 and 64 as previously presented were indefinite. It is unclear why the relationship between the dental arch and the occlusal lingival axis or the surface of a tooth on which an orthodontic is placed is required for determining the scope of claims 28 and 64. In order to expedite allowance, Applicant has amended claims 28 and 64 to specify that the orthodontic appliance defines a mesial edge and a distal edge, and automatically shearing the planar guide comprises automatically shearing the planar guide to

¹³ See, e.g., <http://dictionary.reference.com/browse/frontal>.

¹⁴ Applicant's originally-filed disclosure, paragraph [0012].

¹⁵ Applicant's originally-filed disclosure, paragraph [0062].

¹⁶ Office Action dated February 19, 2010, page 4, item 7.

align the planar guide with at least one of the mesial edge or the distal edge of the orthodontic appliance. Support for the amendments to claims 28 and 64 can be found throughout Applicant's disclosure, such as at paragraph [0041].

For at least these reasons, claims 5–11, 28, 30, 44–50, 64, and 78 particularly point out and distinctly claim the subject matter, as required by 35 U.S.C. § 112, second paragraph. If the rejection of the claims under 35 U.S.C. § 112, second paragraph is maintained in a subsequent Office Action, Applicant respectfully requests clarification as to how the claims are allegedly “insolubly ambiguous without a discernable meaning after all reasonable attempts at construction.”¹⁷

For at least this reason and the reasons discussed above, Applicant respectfully requests reconsideration and withdrawal of the rejection of the claims under 35 U.S.C. § 112, second paragraph.

Claim Rejections Under 35 U.S.C. § 102 and § 103

In the Office Action, claims 1–13, 33–52, 69–74, 80, 81, and 83–86 were rejected under 35 U.S.C. § 102(b) as being anticipated by Taub et al. (U.S. Patent No. 6,334,772, hereinafter “Taub”). In addition, claims 14–28, 31–32, 53–64, 67–68, 75–78, and 82 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Taub, and claims 29, 30, 65, 66, and 79 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Taub in view of Kopelman et al. (U.S. Patent Application Publication No. 2003/014509, hereinafter “Kopelman”). Applicant respectfully traverses the rejection of the claims. Taub fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. § 102(b), and there would have been no apparent reason for modification to include such features, even in view of Kopelman.

For example, Taub fails to teach or suggest a method comprising displaying, via a user interface of a computing device, a 3D digital representation of a tooth of a dental arch within a 3D environment, and, while displaying the digital representation of the tooth of the dental arch, displaying, via the user interface, a two-dimensional (2D) planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the tooth of the dental arch, where the 2D planar guide is displayed separately from the digital

¹⁷ MPEP 2173.02, citing *Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1366 (Fed. Cir. 2004).

representation of the tooth, as recited by Applicant's independent claim 1. Taub also fails to teach or suggest that displaying the planar guide comprises, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location that is based on a position of the orthodontic appliance within the 3D environment, as further recited by claim 1.

Taub is directed to a positioning device that can be used to position and fix an orthodontic element on a surface of the tooth. In a system disclosed by Taub, a camera, which may or may not be attached to the positioning device, continuously captures an image of the physical tooth of the patient and/or the orthodontic element.¹⁸ Taub refers to the image of the tooth and/or appliance captured by the camera as a "real-life image." The real-life image of the tooth and/or orthodontic element is displayed along with superimposed guidance information that indicates an intended position of the orthodontic element on the tooth's surface.¹⁹ According to Taub, the guidance information may be displayed on the screen as a representation of boundaries of either the orthodontic element or the teeth, "which once matched with corresponding boundaries of the displayed real-life image or representation, will yield a proper position" of the orthodontic element.²⁰ Taub refers to the representation of boundaries of either the orthodontic element or the teeth as "virtual" images of the orthodontic element or the teeth. According to Taub, a user can manipulate the physical orthodontic element (as opposed to a virtual orthodontic element) until the real-life image of the orthodontic element coincides with the intended position indicated by the guidance information.²¹

In support of the rejection of claim 1, the Office Action characterized a real-life image of a physical tooth 33 disclosed by Taub as a digital representation of a tooth of a dental arch displayed within a 3D environment. The Office Action also characterized Taub's description of a virtual image of the tooth 33' as a 2D planar guide. The virtual image of the tooth 33' is a part of the "guidance information" disclosed by Taub. Applicant respectfully disagrees that Taub's virtual image of the tooth 33' may reasonably be characterized as a 2D planar guide recited in Applicant's claim 1. For example, claim 1 specifies that as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, the planar guide is

¹⁸ Taub, Abstract.

¹⁹ Taub, Abstract.

²⁰ Taub, col. 5, ll. 32-37.

²¹ Taub, col. 2, ll. 4-6

rendered at a location that is based on a position of the orthodontic appliance within the 3D environment. Taub fails to disclose or suggest that the virtual image of the tooth 33' is rendered at a location within a 3D environment that is based on a position of the orthodontic appliance within that 3D environment, as required by claim 1. Quite the contrary, creating a composite 2D image in which the virtual tooth is superimposed on a 2D image of a real tooth, as described by Taub, is not rendering the virtual tooth within a 3D environment. Furthermore, to the extent the virtual image of a tooth is at some point rendered within a 3D environment (which is not described by Taub), there is no teaching or suggestion that the virtual image is rendered at a position that is in any way a function of a position of an appliance with that same 3D environment.

For example, in Applicant's claim 1, the location of the planar guide is dynamic in that the claims requires that, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, the planar guide is rendered at a location that is based on a position of the orthodontic appliance within the 3D environment. In contrast, even in the composite 2D image in which the virtual image of the tooth 33' is superimposed on the real-life image, as disclosed by Taub, the virtual image remains static, and does not change location based on a position of the bracket 24. Indeed, in Taub, the location of the virtual image of the tooth 33' on the screen is independent of the position of the bracket 24 in order to act as a static indication of the proper position of the bracket 24. In other words, any operation by the user to reposition real-life bracket 24 does not result in movement of the virtual image of tooth 33'. Further, in Taub, placement and orientation a bracket on the virtual tooth is already defined, i.e., fixed by the user. Taub addresses placement of a real-life bracket on a real-life tooth to match that previously defined placement. Taub is not concerned with aiding a practitioner's placement of a virtual orthodontic appliance on a virtual tooth within a 3D environment but instead assumes that this placement has already occurred. For at least these reasons, the Office Action is incorrect in characterizing of the image of tooth 33' as a 2D planar guide that is rendered at a location based on a position of the orthodontic appliance within the 3D environment as the practitioner moves the orthodontic appliance relative to the tooth within that same 3D environment.

Taub fails to disclose or even suggest that the virtual image of the tooth 33' can be rendered at different locations within a 3D environment, much less rendered at a location that is based on a position of an orthodontic appliance within the 3D environment. While Taub

discloses aligning a virtual image of the tooth 33' with the real image of the tooth 33', Taub only contemplates moving the real-life image of the tooth or the real-life orthodontic element relative to the virtual image of the tooth 33'. For example, Taub discloses that the image capturing unit, which captures the real-life image of the tooth 33, may be adjusted "such that the displayed virtual image of the at least one tooth will overlap the corresponding at least one tooth of the real-life image."²² Taub does not suggest that the virtual image of the tooth 33' is even capable of being rendered at different locations within a 3D environment.

Taub is directed to placing a real-life orthodontic element relative to a real-life tooth; the virtual image of the tooth 33' is displayed in a composite 2D image to indicate where the user should move the orthodontic element. As an example, Taub discloses that the virtual image of the tooth 33' is displayed and then the user adjusts the image capturing unit, to which the real-life bracket may be attached, until a displayed real-life image of the tooth 33 overlaps with the displayed virtual image of the at least one tooth 33' or the user adjusts the real-life bracket until a displayed real-life image of the bracket aligns with displayed bracket positioning lines.²³ Thus, in these cases as well as the other examples disclosed by Taub, the user always manipulates the real-life orthodontic element, e.g., by manipulating the bracket positioning device, until the real-life image of the tooth or element displayed on the screen overlaps or matches with the virtual image of the tooth or element, respectively.²⁴ Even when the user manipulates the real-life orthodontic element, the virtual image of the tooth 33' remains in the same place in order to indicate the proper placement of the orthodontic appliance. For at least these reasons, even if movement of the real-life orthodontic element may reasonably be characterized as a practitioner moving an orthodontic appliance within a 3D environment, an assertion with which Applicant disagrees, Taub fails to disclose or suggest a method that includes, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location that is based on a position of the orthodontic appliance within the 3D environment, as required by Applicant's claim 1.

The Office Action asserted that column 7, lines 33–40 of Taub discloses rendering a planar guide at a location that is based on a position of the orthodontic appliance within the 3D environment. However, at column 7, lines 33–40, Taub merely states that the real-life bracket is

²² Taub, col. 3, ll. 20–25.

²³ Taub, col. 3, ll. 5–26.

²⁴ See Taub, col. 3, l. 66 – col. 4, l. 2 and col. 7, ll. 30–32.

repositioned until the virtual images matches boundaries of the teeth. Column 7, lines 33–40 of Taub does not mention rendering a planar guide. Moreover, Taub fails to disclose or even suggest that as the real-life bracket is repositioned, the virtual image of the tooth 33' (asserted to be the “planar guide” by the Office Action”) is rendered at a location that is based on a position of the orthodontic appliance within a 3D environment.

Taub also fails to disclose or suggest displaying, via a user interface of a computing device, a 3D digital representation of a tooth of a dental arch within a 3D environment, as required by claim 1. Taub discloses displaying a 2D image of a tooth 33 along with a virtual image of the tooth 33'. While the real life image of the tooth may be a 2D image of a 3D object, displaying the 2D image does not necessarily require displaying the 2D image within a 3D environment. Taub fails to provide any suggestion that the images of the teeth are displayed within a 3D environment.

Independent claim 4 is directed to a method that comprises displaying, via a user interface of a computing device, a digital representation of a tooth of a dental arch within a 3D environment, positioning an orthodontic appliance at a position within the 3D environment in response to input from a practitioner, and, while displaying the digital representation of the tooth of the dental arch, displaying, via the user interface of a computing device, a two-dimensional planar guide within the 3D environment as a visual aid to the practitioner in adjusting a placement of the orthodontic appliance relative to the tooth of the dental arch within the 3D environment, wherein the two-dimensional planar guide is displayed separately from the digital representation of the tooth. Claim 4 specifies that displaying the planar guide comprises rendering the planar guide at a location within the 3D environment that is based on the position of the orthodontic appliance, receiving input from the practitioner moving the placement of the orthodontic appliance with respect to the tooth within the 3D environment, and automatically moving the planar guide within the 3D environment as the practitioner moves the orthodontic appliance with respect to the tooth within the 3D environment. For at least the reasons discussed above with respect to independent claim 1, independent claim 4 is patentable over Taub.

For at least the reasons discussed above with respect to independent claim 1, Taub fails to disclose or suggest a system comprising a computing device, and modeling software executing on the computing device, where the modeling software comprises a rendering engine that renders a digital representation of a tooth of a dental arch within a 3D environment, and a user interface

that displays the digital representation of the tooth of the dental arch while displaying a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in a placement of an orthodontic appliance relative to the dental arch within the 3D environment, where the rendering engine displays the planar guide separately from the digital representation of the tooth, and wherein, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, the rendering engine renders the planar guide at a location based on a position of the orthodontic appliance within the 3D environment, as required by Applicant's independent claim 39.

In addition, for at least the reasons discussed above with respect to independent claim 1, Taub also fails to disclose or suggest each and every limitation of independent claim 75. Claim 75 recites a non-transitory computer-readable medium comprising instructions for causing a programmable processor to render a digital representation of a tooth within a 3D environment, and, while displaying the digital representation of the tooth, display a two-dimensional planar guide within the 3D environment as a visual aid to a practitioner in the placement of an orthodontic appliance relative to the tooth within the 3D environment, where the planar guide is displayed separately from the digital representation of the tooth, and where the instructions cause the programmable processor to display the planar guide by, as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide at a location based on a position of the orthodontic appliance within the 3D environment.

Dependent Claims

Claims 2, 3, 5-38, 40-74, and 76-82 depend from one of independent claims 1, 4, 39, and 75, and are patentable over the cited references for at least the reasons given above with respect to the independent claims. Claims 2, 3, 5-38, 40-74, and 76-82 recite additional features that are neither disclosed nor suggested by Taub or Kopelman. Applicant addresses some of the dependent claims below for purposes of illustration.

With respect to claims 5-11 and 44-50, which recite different types of 2D planar guides, the Office action characterized various individual lines shown in figures of Taub as planar guides. Applicant respectfully disagrees with these characterizations. The lines shown in the figures of Taub on which the Office Action relies to support the rejection of claims 5-11 and 44-50 are each one dimensional and, therefore, fail define planes. An individual line cannot be

reasonably characterized as a 2D planar guide. For example, claims 5 and 43 each specify that the 2D planar guide comprises a mesial planar guide, and displaying a planar guide further comprises rendering the mesial planar guide and a distal planar guide parallel to a midsagittal plane of the orthodontic appliance. With respect to claims 5 and 43, the Office Action characterized a right-most line 60 shown in FIG. 6 of Taub as a mesial planar guide, a left-most line 60 shown in FIG. 6 of Taub as a distal planar guide. Applicant respectfully disagrees that each of the one dimensional lines 60 shown in FIG. 6 of Taub, which each only extend only in one direction, can reasonably be characterized as a 2D planar guide. Moreover, each of the lines 60 fails to define a plane, and, therefore, cannot reasonably be characterized as planar guides.

Claims 37 and 73 each require displaying contour lines on the planar guide, where each contour line indicates a constant distance to a surface of the tooth within the 3D environment relative to the planar guide. With respect to claims 37 and 73, the Office Action stated that “each dash of the lines shown in figure 4C of Taub has been construed by the Examiner as a contour line indicating a constant distance.”²⁵ Applicant respectfully disagrees with this construction of the dashed lines shown in FIG. 4C of Taub. Taub discloses that the dashed lines represent a virtual image of a tooth 33'. Taub fails to disclose any relationship between the dashed lines and the distance to a surface of a tooth. Thus, Taub fails to provide any basis for the assertions in the Office Action that the dashed lines shown in FIG. 4C of Taub are contour lines in accordance with Applicant's claims 37 and 73.

Claims 14 and 15 recite displaying first and second planar guides as different colors, claim 16 recites a method that includes adjusting a transparency of a planar guide based on input from the practitioner, and claim 17 recites a method that includes displaying a planar guide as opaque or invisible based on input from the practitioner.

With respect to claims 14–17, the Office Action asserted that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Taub to allow for such variations as such modifications are matters of design choice well within the level of ordinary artisans.”²⁶ The Office Action's rationale is insufficient to establish a *prima facie* case of obviousness of claims 14–17. Even based the “obvious matter of design choice” type of obviousness rejection, the Office Action must provide a reason for the

²⁵ Office Action dated February 19, 2010, page 6, item 11.

²⁶ Office Action dated February 19, 2010, page 8, item 16.

proposed modification to a method disclosed by Taub.²⁷ The Office Action must provide an articulated reasoning with some rational underpinning to support a conclusion of obviousness.²⁸ However, in the present case, the Office Action failed to provide a reason one having ordinary skill in the art would have modified Taub to result in the method of claims 14–17. While the Examiner asserted that claims 14–17 would have been an obvious matter of design choice in view of Taub, this assertion of “design choice” does not identify a reason the proposed modification would have been obvious. Accordingly, the Office Action has failed to establish a *prima facie* case of obviousness with respect to claims 14–17.

For at least these reasons, Taub fails to disclose each and every limitation set forth in claims 1–86. Kopelman fails to cure the fundamental deficiencies in the Taub disclosure. For at least these reasons, the Examiner has failed to establish a *prima facie* case for non-patentability of Applicant’s claims 1–86 under 35 U.S.C. §§ 102(b) and 103(a). Reconsideration and withdrawal of the rejection of the claims are respectfully requested.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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²⁷ See MPEP 2144.04(VI)(c), citing *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (BPAI 1984).

²⁸ *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).